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ABSTRACT

Some of the justifiable criticisms of our educational system are due to the inadequacy of the current educational structure for our information society, and the inability of the current system to motivate students to learn. An alternative structure would involve the use of teachers as educational guides, with parents choosing a guide based on information made available in "consumer reports" and other sources. These teachers and their students would be organized in cluster groupings, and students would be divided by developmental levels, as developed by Piaget and Erikson, rather than by grades. Each cluster's success--and income--would depend on how satisfied students and parents were. Teacher guides would guide students to various independent learning laboratories, which would also be in competition with each other for students, and thus, income. School districts would remain intact, but would be made up of independent clusters, learning laboratories, and a consumer aid agency which would provide information on teachers and labs to facilitate parent choice. (9 references) (EW)

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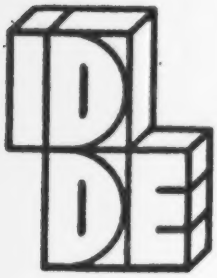

INSTRUCTIONAL DESIGN, DEVELOPMENT, AND EVALUATION

WORKING PAPERS

RESTRUCTURING: THE KEY TO A BETTER EDUCATIONAL SYSTEM FOR AN INFORMATION SOCIETY

by

Charles M. Reigeluth

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Abstract

Our educational system has received considerable criticism lately. Although some of that criticism may be unjustified, it is clear that our educational system does have some important shortcomings. This paper proposes that such "problems" as lack of leadership, and lack of community support are in fact just effects of a more fundamental problem. Just as the one-room schoolhouse, which was so appropriate for an agricultural society, proved to be inadequate for an industrial society, so our present system is proving to be inadequate for an information society. It is the fundamental structure of our educational system that is at the heart of our current problems. For example, it is our group-based lock-stepped, graded, and time-oriented system that has the dubious distinction of effectively destroying the inherent desire to learn in all but a small percent of our children. Also, micro computers are accelerating the trend toward increased use of nonhuman resources in the education of our children, but the current structure of our educational system cannot adequately accommodate the effective use of these powerful educational tools. But what alternatives are there? Until recently there have not been much of any. But our pedagogical knowledge has now evolved to the point where there is a viable alternative to the present structure. This article describes a general approach and a specific strategy for effecting the sorely needed structural changes, and it describes some initial progress on implementing that strategy. This initial progress is a preliminary "blueprint" outlining the structural characteristics that an "idea" educational system should have.

Notes

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There is a growing lack of confidence in our present public school system. Time Magazine has said,

> Like some vast jury gradually and reluctantly arriving at a verdict, politicians, educators, and especially millions of parents have come to believe that the U.S. public schools are in parlous trouble. (1)

The Chronicle of Higher Education reports that educators and noneducators alike are calling for sweeping reforms of America's public schools. (2)

The recent National Commission on Excellence in Education was created because of "the widespread public perception that something is seriously remiss in our educational system." (3) The Commission's report, entitled "A Nation at Risk: The Imperative for Educational Reform", cites Paul Copperman as drawing the conclusion that "for the first time in the history of our country, the educational skills of one generation will not surpass, will not equal, will not even approach, those of their parents." (4) The Commission concluded that "if an unfriendly foreign power had attempted to impose on American the mediocre educational performance that exists today, we might well have viewed it as an act of war." (5) Although many criticisms may be unjustified, it is clear that our present educational system does have some important shortcomings.

Structure: The Heart of our Problems

But what are the causes of the current problems with American education? The Commission cites poor content (we are teaching the wrong things), low standards and expectations (we are not demanding enough from the students), insufficient learning time (we are not teaching it long enough), poor quality of teaching (we are not teaching it well enough), and lack of leadership (we are not getting the kinds of initiative and direction that are needed from our administrators). But are these really the causes? Or rather are they the symptoms of a more fundamental cause? During my years as a high school teacher, I came to realize what many teachers have complained of: that the structure of the educational system works against a teacher's strongest intentions to excite his or her students about learning. When a group of 20 to 40 students troops back out 40 minutes or so later at the ring of another bell, it is difficult to involve and excite each student in meaningful learning. And when the teacher is told what must be taught and often even what textbook to use so that all but a few minutes of classtime per week are fully scheduled in advance, it is difficult either to sustain a love of teaching in the teacher or to instill a love of learning in the student. It is no wonder that the "education" what results is inadequate.

What do we mean when we refer to the "structure" of our operational system? The structure is the basic organization of teaching process. For example, the major structural aspects our present system include (1) group learning: having Knowledge delivered to children in groups of 20 to 40, such that all children receive the same knowledge at the same time and rate; (2) constant rotation: rotating the children from one teacher to another every 45 minutes or so; (3) grade levels: requiring all children to "serve" the same amount of time before they are allowed -- or forced, as the case may be -- to progress to new levels of learning, (4) isolation: having all learning occur within the confines of the school walls and not allowing parents or other segments of the community to participate and cooperate in the teaching process; (5) administrative organization: having a single large school in a district and therefore having administrators who are not also teachers; and so forth.

Of course there are other problems. Bad teachers do exist, lack of parental concern for their children does exist, and so do other problems. But we propose that the major cause of the current problems with our educational system is the basic structure of that system. As the one-room schoolhouse was appropriate for an agrarian society, so our present educational system has a structure and philosophy that were appropriate for an industrial society. For example, the school itself is structured as an assembly line, whereby students move from one specialist teacher to another on the ring of a bell to have a new component of education delivered to them.

As we enter deeper into a highly technological, information-oriented society, the present structure of our educational system will become more and more inadequate, both from the society's point of view and from the school's point of view, not to mention the child's point of view. An information society requires a different kind of person, one who is more of an analyzer, evaluator, problem solver and creative thinker, one who has more initiative, more love of learning, and more responsibility for his or her learning and decision-making. From the school's point of view, it will be directly influenced by forces from the information society. Since the invention of the printing press, there has been a gradual but steady increase in the use of nonhuman resources in the classroom, including textbooks, workbooks, handouts, and audio-visual materials of various kinds. Now, it seem likely that micro computers, because of their interactive capabilities, will greatly accelerate this trend. We are already reaching the point where the current structure of our educational system can no longer adequately accommodate the effective use of such resources. As more and better resources become available to relieve teachers of some of their more routine, boring tasks, we are likely to find even greater internal pressure to adopt a more appropriate structure for our educational system.

In sum, our highly regimented, graded, lock-stepped, group-based, and time-oriented rather than achievement-oriented program is no longer appropriate for the individual, the society, or the school itself. It may have had some value when the students graduated to assembly lines, but it is highly counter productive now. Changing the curriculum, lengthening the school day, and legislating higher standards are band-aid approaches to fixing a broken leg; and they are likely to do as much harm as good in the long run.

In reference to the problems cited by the commission's report, it is the structure of our educational system that renders the selection of content relatively insensitive to teachers and parents -- the two groups that perhaps should, as a team, have the strongest voice (with information and advice provided to them by "curriculum experts" and other concerned people). It is the structure of our educational system that leads to the establishment of "minimum standards" and expectations that are usually tailored to the least capable students in a class. It is the structure of the system that results in a very small proportion of the time in school being spent on actively learning. It is also the structure of the educational system that works against quality teaching by making it harder to teach well and by diminishing the rewards and incentives for quality teaching. Similarly, the structure of our system does not reward the kinds of leadership that are needed, and in fact it often rewards (or at least promotes) good bureaucrats and public relations people instead of good educational leaders.

But if this is true, why hasn't the structure been changed before? The reason is clear: we simply haven't enough pedagogical knowledge to structure it any better way. The alternatives to a group-based, lock-stepped, time-oriented, graded system require the availability of well-designed learning resources and environments, ones that are at once highly effective and highly motivating. We haven't known enough about how to design such resources and environments to make that kind of system feasible. But that situation is changing and has in fact already changed enough so that alternative structures are feasible. (6) The important question then becomes, "What would be a workable approach for determining the best structure and for implementing that structure?"

An Approach for Improving Public Education

Many problem solvers in business, industry, and education feel that initial efforts should entail thinking in the ideal, forgetting temporarily about constraints, and later compromising as necessary to implement a workable plan. When working with professors to help them to improve their courses, Syracuse University's Center for Instructional Development has found that many solutions that are initially thought of as unworkable under current constraints, are in fact workable, and that much better

results are achieved by initially thinking in the ideal. With this kind of approach to improving our educational system, one runs the risk of being labelled a "wide-eyed idealist" at first. In the ultimate analysis, this is usually proves to be practical of all approaches.

Another important concern with respect to an approach for improving public education is that anything beyond fine-tuning of any system requires system-wide planning and modification. Any system that has evolved over as many decades as has our public education system has developed many interdependent, cooperative parts; and a basic tenet of systems theory is that, if you try to significantly change one part, the system will almost always work to change it back again. In fact, except in cases where gradual but sustained changes in the environment have caused gradual changes in a system, important changes in systems have not been gradual, piecemeal developments; rather each has taken the form of a "quantum leap", followed by gradual fine-tuning. (7) Therefore, if we want significant improvement in public education, piecemeal modifications of the structure of the present system will not achieve the desired result. We need comprehensive changes in its structure -- a quantum leap.

Does this mean we need a revolution in education? Yes and no. Yes, we do, in the sense that an agricultural revolution and an industrial revolution occurred and an information revolution is occurring today. But no, we don't, in the sense that widespread disruption, confusion, and loss of jobs that many might associate with "revolution" in education, will not occur. The reasons will become apparent from the following outline of a strategy for "orderly revolution" in the development of an ideal educational system.

A Strategy for Significant Educational Improvement

The airplane represents a quantum leap over the railroad and the automobile in the area of long-distance transportation. And just as a better long-distance transportation system (the airplane) was planned, developed, and gradually implemented and improved over a significant period of time, so also a better educational system can be planned, developed, and gradually introduced and improved over a significant period of time. In fact, any attempt to achieve widespread adoption of any significant innovation within a short period of time (such as occurred with Dewey's progressivism) is virtually doomed to crash, if it ever gets off the ground. The necessary training and coordination simply cannot occur effectively in such a short period of time, and the ideas and techniques inevitably become perverted and effective. Hence, the following strategy is offered:

Phase 1. Develop a comprehensive blueprint for an "ideal", information-society, educational system, with considerable input from educational analysts, practitioners, reformers, parents, and

students. To the extent that it is cost-effective, conduct research and field-tests on parts of the system to improve (replace, modify, or supplement) them as much as possible before implementation of the first prototype.

Phase 2. Identify the community for implementing the first prototype, perhaps a new community that will be starting up a public school system, or perhaps a large city district in which a new system would function as a "alternative school".

Phase 3. Secure funding from private and government sources.

Phase 4. Develop necessary instructional resources (described later), train personnel, build or remodel facilities in the selected community, etc.

Phase 5. Open the prototype school and constantly monitor and revise the various aspects of the system until it operates effectively and smoothly.

Phase 6. Build up an Institute to publicize results of the system, facilitate its adoption by interested school districts, train personnel (and train schools of education to train personnel), accredit schools (but this accreditation would supplement rather than replace state accreditation), monitor and disaccredit schools, develop additional educational resources, and so forth.

Adoption would be a local-school-district decision, and there would be severe limits on the number of new systems that could be implemented each year, because of the training and "retooling" requirements that could realistically be handled by the Institute. Within 10 years of the implementation of the prototype school, it is likely that fewer than five per cent of the nation's public school districts would have changed to the new system. The limitation is not so much one of expense, for we do not anticipate that teacher training would be any more expensive than it is at present, nor would the buildings and resources be any more expensive. Rather the limitation is one of expertise. It will take time for schools of education to learn how to train the new type of teachers. Hence, the new system will be equally affordable for rich and poor districts alike. In fact, it seems plausible that the districts which are having the most trouble will be the first to want to adopt the new system, thereby providing a significant means for redressing current inequality of educational opportunity.

We propose that this is a workable and not particularly expensive strategy for implementing a significant improvement in public education.

INITIAL PROGRESS ON A BLUEPRINT

The remainder of this paper reports on some preliminary

efforts to develop a blueprint for a better educational system (Phase 1 above). We organized a small team of theorists and practitioners, parents and teachers, to work for four months on the initial development of the blueprint. We decided to focus our attention on the structural aspects of an educational system, because there is so much evidence that the current problems are primarily in the structure of the system and because we feel the people of a community should decide on the goals and objectives of their children's education.

Foundations

Many people look back to the one-room schoolhouse with a good deal of longing and nostalgia. As with most things from the "good olde days," the one-room schoolhouse was not everything that we, our parents, or our grandparents remember it as being. There were, however, several educational advantages that the one-room schoolhouse had over our present schools. The teacher worked individually with most students, in contrast to our present group-based system. Students progressed at their own pace, as opposed to our current lock-stepped or tracked system. Students were not promoted to learn new skills and knowledge until they had mastered the current ones (nor were they held back once they had already mastered the current ones), in contrast to our present time-oriented, graded system. The teacher was responsible for the child (as opposed to a content area), was concerned with the whole child (as opposed to just aspect of his or her intellectual development), and was often a partner with the child's parents and thereby responsive to their desires and able to draw on their influence. Also, there were considerable benefits from having children of a variety of different ages in the same room, such as opportunities for peer tutoring and role modeling. A teacher was able to work with each child over a period of years and, therefore, a thorough knowledge of each child and a consistency in monitoring and follow-through existed that is often lacking in today's school. In the present public school system, where children change teachers one or more times each year, the new teachers often just begin to know and understand most of the children by the end of the school year. This results in many needs going unmet and in a great deal of inefficiency in meeting those that re eventually met. And perhaps most important, the reduced knowledge and understanding of each child usually results in a great deal less caring than existed in the one-room schoolhouse. The negative effects of this problem have been made even more severe by today's large and impersonal school environments.

We do not in any way believe that an "ideal" educational system should merely be a one-room schoolhouse with modern paint. Times and needs have changed too much for that. But we do believe that we should carefully consider the positive and negative structural characteristics of our present and past systems in attempting to develop a structure that will be "ideal" for an educational system in a information society.

Overview

In our "ideal" educational system, the teacher's role has changed from one of disseminating knowledge to one of motivating, advising, and managing the child's learning. Well designed resources (including interactive computer and videodisc systems), peer tutors, projects, and learning labs are used to convey most skills and knowledge. A teacher is responsible for each child over a period of three to five years. And the school district picks a variety of small, competing "schools" for parents to select from (all free, and with no power for any of them to turn any children away, thereby providing a degree of diversity and simultaneously a degree of accountability that are both sorely lacking in the present). These and other aspects of the structure of an "ideal" educational system are described next. However, it is important to keep in mind that this blueprint is not likely to be a solution to all our nation's educational problems. We hope it will help to encourage new ideas and to further developments in the design of a better school system.

Teachers as guides. In this educational system, the relationship between the teacher and the child is not one of purveyor and receiver of information. First of all, not all learning occurs in schools; the parent and the community are important sources of learning, and one of the teacher's roles is to orchestrate and coordinate efforts by parents, community, and school. Second of all, within the school, most knowledge is conveyed through well designed resources (including objects, printed materials, and interactive computer-based instruction), inexpensive assistants (including apprentice guides, senior citizen volunteers, parents, and peer tutors), projects, discussion groups, learning labs, resources people, and so forth. Hence, the teacher is more a guide than a teacher, as is the case in the Montessori system, which has functioned extremely well in this mode. The role of the guide is one of motivating, advising, and managing the child, rather than delivering most of the content knowledge. The guide is a conductor rather than a musician; he or she is an instructional manager who helps the child and his or her parents decide upon appropriate instructional goals (within limits) and then helps identify and coordinate the best means for the child to achieve those goals. And those goals go beyond the intellectual development of the child; they may extend to the child's physical, social, moral and psychological development, depending on the parents' wishes. Guides work individually and in small groups with children to insure that they reach their goals. Therefore, there is no such thing as a "class" in the sense of a group of children who learn the same material in the same place at the same time for a whole term or academic year. (There are, however, occasional discussion groups and seminars, which are especially useful in such areas as literature, and some mini-courses utilize class meetings when better alternatives are not

available.) Each child has individual educational goals and could be matched to a unique combination of resources. The cost-effectiveness of this system is very promising and is discussed later.

Developmental levels as grades. In this school system a guide is responsible for each of his or her students for one of the developmental stages of the child's life: a period of approximately 3 to 5 years. On the basis of work by Piaget and Erikson, we currently conceive of four stages as being relevant to the school system: approximately ages 3 to 5, 6 to 9, 10 to 13, and 14 to 18. The school organization is structured around these four levels, enabling each guide to work with a child for an average of four years. Either the parents or the guide can request a change sooner than the full number of years, but there is a "test period" of 6 months during which no change are allowed. The process whereby parents request a guide is described next.

Parents choose guides. Parents request a guide for each of their children. On the basis of information made available by an independent "consumer reports" type of district office and on the basis of word of mouth and interviews with guides, the parents request in order of preference about three to five guides (depending on the size of the school district). The "consumer aid office also provides diagnostic testing and interviews to help parents make the best decision, or to make it for them if they are not interested. Each guide decides how many children to accept each year, but does not decide which children to accept -- that is decided by a formula that maximizes the number of first choice filled district-wide.

Clusters" as independent schools. In other professions like medicine and law, professionals often work together rather than independently; and, unlike teachers, they maintain a high degree of decision-making participation in and control over the organization. In a similar way, even though parents choose an individual guide, that guide does not work independently, but is a member of a cluster of guides. A cluster usually consists of about 3 to 6 guides, their assistants, their students, and a leader, who is a "master guide". Like a lawyer in a law firm, each guide has considerable responsibility for the success of the cluster, and considerable incentive to meet that responsibility (see next paragraph), and considerable power to meet that responsibility. In the present system, teachers are given the first but not the last two! Is it any wonder that the structure works against good results! Just as the "administrator" of a law firm is a practicing lawyer (or several), so the master guide (or guides) is an active teacher. But the master guide also has a variety of other responsibilities, foremost of which is instructional leadership for the cluster. Ultimately, the master guide has the major responsibility for the success of the cluster.

Incentives and rewards. The cluster's success depends on how satisfied parents and children are, because its income depends in

part on the number of first, second, and third choice requests for all of its guides. But it is the income of each cluster that depends on demand for its guides, not the income of each guide directly. The guides' salaries are based only on the number of students he or she has and the cluster's gross income. Hence, there is considerable incentive to help any guides in the cluster who are not doing well. This results in a nice combination of competition between clusters (providing incentive for excellence and responsiveness to the community's diverse desires and needs) and cooperation within each cluster (providing rapport and encouragement among guides), not unlike that characterizing most other professions. With respect to competition, the dependence of cluster income on customer satisfaction makes guides very accountable for what they do or don't do. If a cluster is doing a bad job of meeting customers'needs, its income will fall, as will the income for all of its guides. With respect to cooperation within each cluster, the fact that a guide's income depends not only on his or her own efforts, but also on the success of the other guides in the cluster results in a much greater incentive to cooperate and help each other to insure that all the cluster's children do as well as they can.

Learning labs. In the fields of law and medicine, the general practitioner has access to specialists in different areas. In a similar way, the guide has access to various learning labs. A learning lab provides instruction in a specific subject area. It can be a traditional, discipline-oriented area such as biology or a cross-disciplinary, problem-oriented area such as pollution. These learning labs operate completely independently of the cluster. All children in the school district receive certain number of tickets or passes that entitle them to use the learning labs. The labs in turn receive their budgets on the basis of the number of passes that they collect, so there is considerable incentive to attract students and satisfy guides' needs. Again there is a nice combination of competition between labs and cooperation within a lab. There are three types of learning labs: mobile labs, "shopping mall" labs, and site labs. They are described in some detail later.

In summary, the major aspects of the "ideal" educational system for an information society are the following:

1. Teachers are guides who, in cooperation with the child's parents motivate, advise, and manage a child's education for 3 to 5 years.
2. Resources (including well-designed materials, peer tutors, projects, discussion groups, learning labs, and resource people) are used to effect most of the learning.
3. There are not traditional "classes", but each child has individual goals, and a unique combination of resources and approaches is prescribed to reach those goals.
4. Guides work cooperatively within an educational cluster with about 2 to 5 other guides, including a master guide.
5. The master guide sets the school climate and philosophy, hires guides and assistants, and provides professional

development for guides and assistants and direction and leadership for the whole cluster.

6. After a trail period, parents are free to move their children to other guides and other clusters if they are not satisfied with their child's progress. Hence, individual guides and clusters are very accountable for what they do or don't do, and they have considerable incentive to work with parents.
7. Guides have a great financial incentive to cooperate and work together for the success of the whole cluster.
8. Guides can send children to learning labs of various kinds to receive the best available instruction on selected subjects.

The following is a more detailed description of the various aspects of the structure of this educational system.

CLUSTER OPERATIONS

Since the guide is the hub of this educational universe, we shall further describe the structure of the system on that level. As was mentioned above, every guide must belong to a cluster, which is much like a small law firm or medical clinic. Also, a guide is responsible for children on one level of development (approximately four years). In an exceptional case, a guide might prefer that his or her students be spread out over two or even three levels rather than just one. In such cases it is probably advisable that children switch to a different guide upon transitioning to the second level. Each guide often uses apprentices (training to become guides), advanced students, and volunteers (including parents, senior citizens, and other members of the community) as assistants to help teach his or her students. Many receive credits for their services rather than money. Those credits entitle them to personal use of the learning labs for continuing education. Tutoring is also a valuable experience for students. There is an apt addage that goes, "The best way to learn something is to teach it," and indeed I feel that I learned more about Economics in one year of teaching it in high school than in three years of majoring in it in college. Students are a very much overlooked resource that can save a school system much money, improve learning, and result in even greater benefits for the tutors.

At this point, our best guess is that in Level 1 (ages 3 to 5) each guide is responsible for about 25 children, in Level 2 (ages 6 to 9) about 35 children, in Level 3 (ages 10 to 13) about 50 children, and in Level 4 (ages 14 to 18) about 65 children. These differentials reflect the increased use of learning labs as the age level increases. Also, keep in mind that the services of apprentices, advanced students and volunteers considerably lightens the load of each guide. However, we must caution that these figures are best guess at present, and experience may reveal better figures. Also, as mentioned earlier, each guide decides how many children to accept (what portion of a "full load" to accept). The importance of parent satisfaction keeps this figure

from becoming too large, and the guide's personal income keeps it from being too small. But if a guide wants to work half time on, say, writing a book, then he or she can do so by accepting fewer students (and receiving a lower income).

Anywhere from about 3 to 6 guides can comprise a cluster. With 4 guides in each cluster, there would be one guide on each of the four developmental levels, assuming that the cluster elects to serve all four levels. Such a cluster would have about 175 children spread out over the ages of 3 to 18. This means that there would be an average of about 12 children of any given age within the cluster. This size allows the children to get to know most other students in the cluster fairly well, resulting in a more friendly and caring environment and more cross-age interaction.

Specifics by Level

In Level 1 the guides are very similar to Montessori teachers. They introduce children to well-designed educational resources as the children become ready for them, and the resources do most of the teaching of knowledge and skills. The guides also arrange activities that help develop the child socially, emotionally, and physically (motor coordination). Children are exposed to a variable environment in which caring guides and assistants nurture their development and encourage them to alternate regularly between learning activity and social interaction, free play;, exercise, and/or rest. Most learning takes place within appropriate cluster facilities, but fieldtrips are occasionally taken so that the outside environment can influence their development. Mobile labs (discussed in the next section) and other outsiders (including parents) occasionally come and put on a program to enrich home-room activities.

Parents can leave their child in the cluster facility as long as they wish, but there is a charge if the child is left for more than six hours per day. This charge can be paid in money or in time contributed to the cluster. The more advanced children occasionally participate in activities in a level II group. This facilitates their transition into the next level with a minimum of anxiety (even if the child advances to a different cluster). The timing of the full "graduation" to the next level is made in consultation with the parents and is based on a combination of the child's intellectual, social, and emotional development, including degree of self-directedness and responsibility.

In Level 4 the cluster facility is more of a conference room than a home room and activity room. Almost all content learning occurs in the learning labs, including lab-sponsored seminar, projects, tutoring sessions, and so forth. Also, intellectual scavenger hunts entailing interdisciplinary problem solving are widely used. Guides spend much time monitoring and motivating the children and just plain caring. Much time is also spent in individual conversations, for the guide is more a counsellor (an

educator in the true sense of the word) than a teacher. In the domain of cognitive development, those conversations are often directed at higher levels of knowledge, including synthesis and evaluation in Bloom's taxonomy (8) and cognitive strategies (or generic skills) in Gagne's taxonomy (9). Service projects are often required of students.

The guide also works closely with the parents on such other concerns as the child's emotional, social, artistic, moral, and psychological development. This entails (1) identifying with the parents any aspects of development that need work or any obstacles to further development that need to be removed, and (2) developing an appropriate plan that entails certain parental actions as well as certain guide actions of which the parents approve. It also entails providing advice -- when desired by the parents -- on how to handle behavior problems and how in general to increase the quality of home life.

On the intervening levels (II and III), the guides serve both roles described above (for Levels I and IV). The degree to which each role is played by the guide progresses as the child develops from a Level I person to a Level IV person.

At whatever level, each guide must abide by a "renaissance approach" that establishes certain minimum levels of development in each of a broad range of basic areas (including basic skills). I have wonderful memories of a summer camp in which we campers were allowed to go to whatever activity we wanted whenever we wanted. There was a big chart on which achievements in each activity were posted for each camper, and we had to progress by one level of achievement in each activity every week.. That way, when we went to do an activity that we didn't particularly like, we decided when to do it and we were motivated to get it done. And of course we all tended to far exceed the one-level minimum in activities that we like. Also there were points given for each achievement, and campers were members of teams that competed to get the highest number of points.

Similarly, in our "ideal" educational system, as long as the minimum levels of achievement are met in all areas, the children can study whatever they want whenever they want. As might be expected, the yearly and monthly minimum levels very depending on the general ability level of the child. For example, a child with an IQ of 50 is not expected to achieve the same minimum levels as one with an IQ of 150. The emphasis is on each child achieving according to his or her potential. For "late bloomers" the minimum levels are adjusted to represent relatively larger steps.

The guide maintains an achievement profile on each of his or her students on a computer-based management system. Grades are not given, because in an information society, the kinds of abilities and knowledge one has are more important than a letter grade or a general rank in class.

There are cluster-wide and district-wide interest groups and clubs, dealing with such interests as computers, drama, photography woodworking, music, chess, dance, etc. There are also cluster-wide and district-wide social events and athletic events. A major benefit of this structure is a much higher rate of student participation in athletics and other interests. Opportunities for leadership and exercise of responsibility are also increased. Volunteers (parents, senior citizens, and other community members) and older students do much of the supervision, much as is presently done with Little League baseball.

Leaning Labs

It was mentioned earlier that learning labs provide specialized expertise on different subject areas; and we have recently seen that the older the child, the more the labs are used. A learning lab can be for a traditional, discipline-oriented area such as biology or for a cross-disciplinary, problem-oriented area such as pollution; and it can be for an intellectual area such as philosophy or for a technical area such as automobile maintenance and repair. Also, resources are allocated to the labs on the basis of their usage, providing a combination of cooperation and competition similar to that for the clusters.

We ,mentioned earlier that there are three types of learning labs: mobil labs, "shopping mall" labs, and site labs. The mobile labs are labs on wheels that travel around from one cluster to another and even one district to another. The shopping mall labs are centrally located labs to which the children in a district go. They range from a one-room, one-man (part-time) "craft shop" operation to a nation-wide operation (the Sears of the shopping mall labs). There tends to be continuous (although not too frequent) turnover as the "offerings" adjust to changing times and changing demands. Also, there are cooperative arrangements whereby children use labs located in another school district. The site labs are located at the part-time organizations which sponsor them, such as museums and businesses. Tax write-offs are an important incentive for the creation of such labs.

All learning labs must be approved and periodically recertified by the school district's Lab Management Organization (described later). Learning labs can be started by almost anyone in any subject area, including cross-disciplinary areas, but certain training and standards (especially regarding character) are required. A learning lab director runs the lab; and depending on the nature of the lab, the director finds out about and makes available top-quality resources, plans good activities, makes arrangements for community-based experiences, hires, trains and monitors assistants (apprentices, advanced students, parents, and other members of the community) to help teach, and/or interacts personally with children to motivate, advise, and manage their learning within that specialty area. Teachers refer their students to specific learning labs and even to specific personnel

in a learning lab. Many learning labs are run by part-time amateur/hobbyists and retired people at very little expense to the school district.

How the Student Uses the learning Labs

At the beginning of each quarter (three month period), each student in the district is awarded a certain number of learning lab passes. The exact number depends on the child's level of intellectual development -- the higher the development, the more the anticipated use of labs. Also, each child can earn additional passes through such activities as tutoring, helping with the preparation of displays and materials, supervising extra-curricular activities, etc. Some of the passes are "restricted" passes and some are "open passes> The restricted passes must be used for the study of skills and knowledge specified by the child's "menu" (see below), whereas the open passes can be used to study anything. This results in a combination of structure and flexibility similar to that of the summer camp described earlier.

Each pass must be filled out and signed by the guide, who indicates the lab in which it is to be used. This helps the guide to influence and keep track of the child's learning. The child hands in the pass to the lab, so that the lab can then cash it in for payment from the school board. The passes could be implemented electronically with magnetic ID cards and electronic time clocks that feed data on student and lab usage into a computer. Teacher approval would be entered into the computer system, and the system would reject any child who tried to log in to a lab without such approval. Each lab allows each student a minimum of one hour of free "browsing" every quarter for purposes of seeing if there is anything he or she would like to learn in that lab. Of course, the lab receives remuneration from the school district for such browsing.

Having a limited supply of passes to use in a quarter, the children are more concerned with making the most of each one -- that is, not wasting precious time "hacking around." And having the flexibility to study what they want when they want (within the structure of the minimum requirements and the other goals specified in each child's quarterly contract) provides heightened motivation and increased self-determination and self-management that are so important in an information society.

What the Student Does

At the beginning of each quarter, the guide sits down with each of his or her students and the student's parents, if possible. Together, they prepare a plan or contract for the child's learning goals and activities for the quarter. As a result of this plan, a menu of required goals and activities is prepared (probably with the help of a computer-managed instruction system), and the use of restricted passes is planned. However,

the plan is devised in such a way as to leave some time for children to pursue their own interests with their open passes, whose use is also discussed and informally planned at the beginning of each quarter. The intent here is to establish a balance between structure and flexibility. Each cluster may establish its own policy (or lack thereof) with respect to the balance between requirements and options, except that the district may establish certain minimum levels of development in different areas for different age groups (perhaps adjusted by individual limits to rate of development as measured by, say, IQ).

At this time, the guide and parents may also have a private conversation about any problems the parents are having with the child so that the guide can give advice and/or take steps to help out. The guide also identifies things the parents can do or need to do to help the child achieve his or her quarterly goals (not just intellectual, but also emotional, social, artistic, physical, etc.)

At the end of each quarter, the guide sits down with each child and the parents (although two separate meetings would not be uncommon), and reviews the child's achievements in relation to the plan or contract for the quarter. This provides part of the basis for planning the next quarterly contract, which usually occurs at the same session.

Extensions of the Present System

The present educational system would be extended in two important way, in addition to the concern for non-academic aspects of the child's development: (1) it is open longer and (2) it is open to use by adults. It is open longer in three way. It is open more hours per day, until, say, 9:00 p.m. This is done at very little extra expense because it is supervised by volunteer help. It is open on weekends, again at little extra expense due to volunteer help. And it is open all summer long. Students can take vacations whenever their parents want, due to the individualized structure of the school. Similarly, staff can take their vacations pretty much whenever they want because of the multiple staffing structure of the system (apprentice guides, volunteers, and older students). Guides feel less of a need for a long vacation in their new roles, and this eliminates the need to find summer employment at what are often not very rewarding (professionally or financially)jobs.

Adults (people over 18 years old) can buy or earn passes to use the learning labs, making the school system a place where young and old can learn together. It also provides an extra source of income and labor for running the school system.

District Organization and Administrative System

All school tax revenues, block grants, and state aid go directly to the school board for district-wide distribution. The

school board then pays (1) each cluster in accordance with the demand for its guides, (2) the Learning Lab Management Organization, which receives a lump sum, and (3) the Consumer Aid Agency, which receives a flat percentage of the total school district budget (around one percent).

Cluster Organization and Administration

A new cluster can be started by anyone who meets the requirements, but a cluster can be disbanded if it ever fails to meet minimum standards set by the school board. It is probably wise to specify a minimum of 3 guides for forming a cluster. Training and certification are required for anyone who wants to be a guide. Some local training may also be required in the areas of the district's computer-based record keeping system and current learning labs. The master guide is chosen by the guides that comprise the cluster, and a 3/4 majority is required.

For an established cluster, the hiring of new guides is decided by a 3/4 majority of the cluster's guides. The firing of a guide would be based on standards that are clearly laid out in the charter of the cluster or school district regulations, but those standards should allow a sufficient length of time for new guides to improve and for older guides to reform their way. Because of the importance of cluster cohesiveness and cooperation among guides, a simple majority is sufficient for a cluster's guides to decide whether or not the criteria for release have been met. There is no grievance or appeal procedure, again because of the importance of cluster cohesiveness and cooperation among guides.

A separate administrative person or group is in charge of the accounting, reporting, and logistical aspects for all clusters within the school district, but the cluster decides how its revenues will be spent. This frees the head guide to concentrate on instructional concerns and school climate.

It was mentioned earlier that each cluster's gross income is dependent to some extent on the total demand for its guides. A point system is used whereby each guide receives 3 points for being the first choice of a "new" student (one entering a new level of development, one entering the school system for the first time, or one requesting a new guide), 2 points for being the second choice, and 1 point for being the third choice. The "income rate" is determined solely by the cluster's total points divided by the number of guides in the cluster. Then that income rate is adjusted according to the average percent of "full capacity" for its guides (determined by the number of students divided by the full-load number of students for that developmental level). Hence, the guides' salaries are based on cluster performance and load only -- no merit -- and are a percent of cluster's gross income. In this way, there is a tremendous incentive to cooperate within each cluster. All master guides' receive a fixed salary supplement set by the school board.

Learning Lab Management Organization

There is a Learning Lab Management Organization which as the following responsibilities:

* It surveys the needs of the clusters for external instructional support and priorities those needs.
* It contracts new learning labs. These may be (1) part-time individuals (e.g., a retired biologist who lives in the community and is willing to devote a part of her time to the school district), (2) part-time organizations (e.g., a local museum or business which is willing to devote a part of its time to the school district), (3) full-time individuals (e.g., a mechanic who would like to quit his job and work full-time with kids), and (4) full-time organizations (e.g., a publishing company that has established a subsidiary for running learning labs in schools across the country.
* It trains lab directors whenever necessary, and it provides professional development support services to the labs upon request.
* It distributes money to the labs according to the amount that each lab is used.

The same administrative person or group is in charge of the accounting, reporting, and logistical aspects for all labs within the school district, but again each lab decides how its revenues will be spent.

Consumer Aid Agency

The district-wide Consumer Aid Agency which was mentioned earlier serves (1) as a placement counseling service for matching children with guides and (2) as a watchdog service for providing "consumer reports" on cluster, guides, and learning labs (explained below). This Consumer Aid Agency is run by parents (many on a volunteer basis) but receives a permanent fixed budget (something like one percent of the toil district budget) as part of a system of "checks and balances".

The Consumer Aid Agency's counselling service helps parents to decide which guide will be best for their child. It maintains extensive data on each guide's characteristics and accomplishments, and it diagnoses a child's needs if parents so desire, so as to enable them to select the guides which seem most likely to meet those needs. Such people-categories as "intuiter" and "thinker" may be very useful for part of this function.

The Consumer Aid Agency's watchdog service has responsibility for collecting and disseminating information about the quality of the work of the clusters, the guides, the labs, and the Lab Management Organization.

Given that some parents do not care enough to choose a guide for their child, the placement service automatically diagnoses each such child's needs and applies for the most appropriate guides. However, such applications are usually not included in the point count described under "Cluster Organization and Administration" above, to avoid the temptation for dirty politics. Federal supplements for disadvantaged children would be passed through the district office directly to the clusters' budgets.

Cost-Effectiveness

No through cost analysis has been performed as yet, but preliminary indications are that this system would cost approximately the same per student as our present system, yet would be considerably more effective. Although guides would be paid more than present teachers, their various assistants (apprentice guides, volunteers, and older students) cost considerably less. Their use enables a much higher student-guide ratio, but with increased human contact. The learning labs are the element which may most influence costs. The number of labs and relatedly the number of passes provided to students each quarter will greatly influence the cost. Also, the extent to which the labs are staffed and/or directed by volunteers or semi-volunteers (those who accept nominal payment to supplement social security or other income) will also greatly influence the cost. In a small school district, it might be wise for each guide to also serve as a lab director. We presently anticipate that this entire system can be run within present school budgets, especially given that local businesses, foundations, and individuals would be considerably more inclined to sponsor learning labs, including basic-skill and content-area shopping mall labs, as well as more application-oriented and problem-oriented site labs.

CONCLUSION

Much work needs to be done to further develop, field-test, and refine this blueprint of a third-wave educational system to the point where we can begin to think about implementing it in a pilot school. And this only represents the first step in a systematic strategy to improve our educational system. Although the road to significant improvement in public education is long and difficult, we feel that the strategy and approach are both very sound. With persistance and dedication from a national coalition of concerned citizens, we feel confident that we can achieve very significant improvements.

Footnotes

1. Time, June 16, 1982, p.54

2. The Chronicle of Higher Education, Nov.3, 1982, Vol. XXV, No. 10, p.1

3. The National Commission on Excellence in Education, A Nation at Risk: The Imperative for Educational Reform, April, 1983, p.1

4. Ibid, p.11

5. Ibid, p.5

6. For a summary of much of the recent knowledge about how to design effective and appealing educational resources, see Reigeluth, C.M. (Ed.), Instructional Design Theories and Models: An Overview of their Current Status. Hillsdale, N.J.: Erlbaum Associates, 1983.

7. D. Heuston, The promise and inevitability of videodisc in education (Paper submitted to the National Institute of Education), WICAT, New York and Orem, UT, September 1977. (ERIC Document Reproduction Service, No. ED 153-636)

8. B.S. Bloom (ed.), Taxonomy of Educational Objectives, Handbook I: Cognitive Domain, David McKay, New York, 1956

9. R.M. Gagne, The Conditions of Learning, 3rd ed., Holt, Rinehart and Winston, New York, 1977.

PREVIOUS WORKING PAPERS

The following is a list of IDD&E Working Papers that have been published. With the exception of the *titles, these Working Papers are available at 50 cents each plus postage.

* 1. Meaningfulness and Instruction: Relating What is Being Learned to What a Student Knows by CHarles M. Reigeluth, March 1980 (34pp.)

* 2. Relating What is to be Learned to What is Known: Subsumptive Sequencing, Coordination, and Cognitive Strategies Activation by Faith S. Stein, Jody K. Witham and Charles M. Reigeluth, APril 1980 (44pp.)

* 3. Toward a Common Knowledge Base: The Evolution of Instructional Science by Charles M. Reigeluth, August 1980 (44 pp.)

* 4. Using Videodiscs in Instruction: Realizing Their Potential Through Instructional Design by Charles M. Reigeluth and Joanne Garfield, September 1980 (41pp.)

* 5. The Use of Sequence and Synthesis for Teaching Concepts by Linda Frey and Charles M. Reigeluth, December 1981 (16pp.)

* 6. A Comparison of Three Instructional Presentation Formats by Bonnie Keller and Charles M. Reigeluth, January 1982 (30pp.)

* 7. Type and Position of Adjunct Questions: Their Effects on Memory and Application by Afnan N. Darwazeh and Charles M. Reigeluth, February 1982 (18pp.)

* 8. The Effects of Sequence and Synthesis on Concept Learning Using a Parts Conceptual Structure by C. Herbert Carson and Charles M. Reigeluth, February 1983 (23pp.)

* 9. The Effects of Analogies on Student Motivation and Performance in an Eighth Grade Science Context by Ruth V. Curtis and Charles M. Reigeluth, March 1983 (31pp.)

*10. Use of the ARCS Model of Motivation in Teacher Training by John M. Keller, March 1983 (9 pp.)

*11. The Effect of Three Different Kinds of Feedback: Hint, Correct Answer, and Right/Wrong by Betty Feng and Charles M. Reigeluth, April 1983 (19 pp.)

*12. Effects of Four Instructional Sequences on Application and transfer by Chun-I Chao, Luz Ruiz and Charles M. Reigeluth, May 1983 (23 pp.)

*13. The Effects of Format of Synthesizer on Conceptual Learning by Lois McLean, N. Kai Yeh and Charles M. Reigeluth, June 1983 (23pp.)

*14. Current Trends in Task Analysis: The Integration of Task Analysis and Instructional Design by Charles M. Reigeluth, July 1983 (20 pp.)

*15. Motivation Design by John M. Keller, August 1983 (12 pp.)

*16. Restructuring: The Key to a Better Educational System for and Information Society by Charles M. Reigeluth, September 1983 (22 pp.)